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0001/PTO Rev. 10/95		U.S. Department of Commerce Patent and Trademark Office	
<b>TRANSMITTAL FORM</b>  <i>(to be used for all correspondence during pendency of filed application)</i>		Application Number	10/684,950
		Filing Date	October 13, 2003
		First Named Inventor	Michael A. Horton
		Group Art Unit Number	Not Yet Known
		Examiner Name	Not Yet Known
Total Number of Pages in This Submission	8*	Attorney Docket Number	18856-08206

ENCLOSURES (check all that apply)	
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Signature:			
Attorney/Reg. No.:	Albert C. Smith/Reg. No. 20,355	Dated:	1/28/04

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Michael A. Horton  
APPLICATION NO.: 10/684,950  
FILING DATE: October 13, 2003  
TITLE: Dynamic Attitude Measurement Method And Apparatus  
EXAMINER: Not Yet Known  
GROUP ART UNIT: Not Yet Known  
ATTY. DKT. NO.: 18856-08206

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**INFORMATION DISCLOSURE STATEMENT**

**Under 37 CFR §§ 1.56 and 1.97-98**

SIR:

Pursuant to the provisions of 37 CFR §§ 1.56 and 1.97-98, enclosed herewith is modified form PTO/SB/08A listing references for consideration by the Examiner. Enclosed is a copy of each non-patent listed reference that may be material to the examination of this application, and for which there may be a duty to disclose.

The filing of this Information Disclosure Statement shall not be construed as a representation regarding the completeness of the list of references, or that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or that a search has been made, or as an admission that the information listed is, or may be considered to be, material to patentability, or that no other material information exists, and shall not be construed as an admission against interest in any manner.

This Information Disclosure Statement is being filed:

- ☒ within three months of the filing date of the application, or date of entry into the national stage of an international application, or before the mailing date of a first office action on the merits, whichever event last occurred;
- ☐ before the mailing of a first official action after the filing of a request for continued examination (RCE) under 37 CFR § 1.114;

- ☐ after three months of the filing date of this national application or the date of entry of the national stage in an international application, or after the mailing date of the first official action on the merits, whichever event last occurred, but before the mailing date of the first to occur of either: (1) a final action under 37 CFR §1.113; or (2) an action that otherwise closes prosecution in the application, and:
  - ☐ attached hereto is the fee set forth under 37 CFR §1.17(p) for submission of this Information Disclosure Statement under 37 CFR. § 1.97(c); OR
  - ☐ Applicant certifies pursuant to 37 CFR § 1.97(e) that:
    - ☐ each item of information contained in this Information Disclosure Statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Statement; OR
    - ☐ no item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of the person signing this certification after making reasonable inquiry, no item of information contained in this Statement was known to any individual designated under 37 CFR § 1.56(c) more than three months prior to the filing of this Statement;
- ☐ on or before the payment of the issue fee but after the mailing date of the first to occur of either: (1) a final action under 37 CFR § 1.113; (2) a notice of allowance under 37 CFR § 1.311; or (3) an action that otherwise closes prosecution in the application, and:
  - ☐ Applicant certifies pursuant to 37 CFR. § 1.97(e) that:
    - ☐ each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Statement; or
    - ☐ no item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of the person signing this

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certification after making reasonable inquiry, no item of information contained in this Statement was known to any individual designated under 37 CFR § 1.56(c) more than three months prior to the filing of this Statement; AND

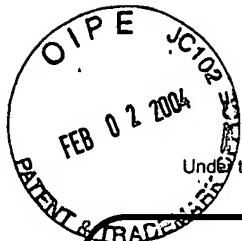
- ☐ attached hereto is the fee set forth under 37 CFR §1.17(p) for submission of this Information Disclosure Statement under 37 CFR. § 1.97(c); OR
- ☐ after the payment of the issue fee. Applicant requests that the information contained in this Information Disclosure Statement be placed in the file according to 37 CFR § 1.97(i), although the information may not be considered by the USPTO.
- ☐ This application relies, under 35 U.S.C. § 120, on the earlier filing date of prior application No. APPLICATION NO., filed on DATE FILED, and the references cited therein are hereby referenced, but are not required to be provided in this application under 37 CFR § 1.98(d).
- ☐ Each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement. 37 CFR § 1.704(d).
- ☒ Applicant submits that no fee is required for the consideration of this Information Disclosure Statement.

Consideration of the listed references and favorable action are solicited.

Respectfully submitted,  
MICHAEL A. HORTON

Dated: 1/28/04

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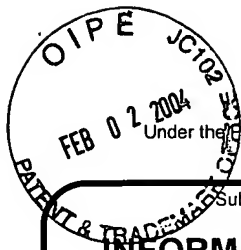
Substitute for form 1449A/PTO			Complete if Known		
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>			Application No.	10/684,950	
			Filing Date	October 13, 2003	
			First Named Inventor	Michael A. Horton	
			Art Unit	Not yet known	
			Examiner Name	Not yet known	
Sheet	1	of	4	Attorney Docket Number	18856-08206

U.S. PATENT DOCUMENTS				
Examiner Initials*	Cite No. <sup>1</sup>	Document No. Number – Kind Code <sup>2</sup> (if known)	Date MM-YYYY	Name of Patentee or Applicant of Cited Document
	A1	US-4,038,876	08-1977	Horton
	A2	US-4,134,681	01-1979	Elmer
	A3	US-4,318,300	03-1982	Maughmer
	A4	US-4,399,692	08-1983	Hulsing, II <i>et al.</i>
	A5	US-4,454,756	06-1984	Sharp <i>et al.</i>
	A6	US-4,827,624	05-1989	Franklin <i>et al.</i>
	A7	US-4,914,598	04-1990	Krogmann <i>et al.</i>
	A8	US-5,031,330	07-1991	Stuart
	A9	US-5,148,604	09-1992	Bantien
	A10	US-5,172,323	12-1992	Schmidt
	A11	US-5,210,954	05-1993	Schafner
	A12	US-5,237,753	08-1993	Carlson <i>et al.</i>
	A13	US-5,241,850	09-1993	Kawate
	A14	US-5,287,628	02-1994	Yamaguchi <i>et al.</i>
	A15	US-5,335,190	08-1994	Nagle <i>et al.</i>
	A16	US-5,351,539	10-1994	Ziegenbein <i>et al.</i>
	A17	US-5,381,604	01-1995	Heidel <i>et al.</i>
	A18	US-5,392,112	02-1995	Nakamura
	A19	US-5,400,033	03-1995	Hablani
	A20	US-5,615,132	03-1997	Horton <i>et al.</i>
	A21	US-5,819,206	10-1998	Horton <i>et al.</i>
	A22	US-6,061,611	05-2000	Whitmore
	A23	US-6,088,653	07-2000	Sheikh <i>et al.</i>
	A24	US-6,176,837	01-2001	Foxlin
	A25	US-6,205,401	03-2001	Pickhard <i>et al.</i>

Examiner Signature		Date Considered	
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				Filing Date	October 13, 2003
				First Named Inventor	Michael A. Horton
				Art Unit	Not yet known
				Examiner Name	Not yet known
Sheet	2	of	4	Attorney Docket Number	18856-08206

U.S. PATENT DOCUMENTS				
Examiner Initials*	Cite No. <sup>1</sup>	Document No. Number – Kind Code <sup>2</sup> (if known)	Date MM-YYYY	Name of Patentee or Applicant of Cited Document
	A26	US-6,421,622	07-2002	Horton et al.

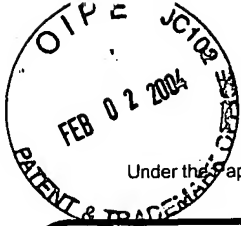
FOREIGN PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document Country Code <sup>3</sup> – Number <sup>4</sup> Kind Code <sup>5</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T <sup>6</sup>

OTHER REFERENCES – NON-PATENT LITERATURE DOCUMENTS				
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	C1	Chung, D. et al., “Strapdown INS Error Model for Multiposition Alignment,” IEEE Transactions on Aerospace and Electronic Systems; Vol. 32, No. 4; Oct. 1996; pp. 1362-1366.		
	C2	Randle, J. et al.; “Low Cost Navigation Using Micro-Machined Technology,” IEEE Conference on Intelligent Transportation System; 1997, p. 1064-1067.		
	C3	Creamer, G. et al.; “Attitude Determination and Control of Clementine During Lunar Mapping,” Journal of Guidance Control and Dynamics, Vol. 19, No. 3; May-June 1996; pp. 505-511.		
	C4	Mehra, R. et al.; “Adapting Kalman Filtering, Failure Detection and Identification for Spacecraft Attitude Estimation,” Proceedings of 4 <sup>th</sup> IEEE Conference on Control Applications; 1995, pp. 176-181.		
	C5	ADXL50/ADXL05 Evaluation Modules, Analog Devices, Inc., 1996, 2 pages.		

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				Art Unit	Not yet known
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Sheet	3	of	4	Attorney Docket Number	18856-08206

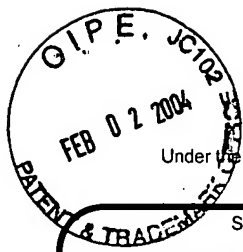
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	C6	Aramanovitch, L. et al; "Quaternion Non-Linear Filter for Estimation of Rotating Body Attitude," Mathematical Methods in the Applied Sciences, Vol. 18, No. 15; Dec. 1995, pp. 1239-1255.		
	C7	Bar-Itzhack, et al.; "Recursive Attitude Determination From Vector Observations: Direction Cosine Matrix Identification," Journal of Guidance Control and Dynamics, Vol. 7, No. 1; Jan.-Feb. 1984, p. 51-56.		
	C8	Berman, Z.; "On Range and Attitude Estimation," IEEE Position Location and Navigation Symposium; Apr. 11-15, 1994, pp. 344-347.		
	C9	Guo-Shing-Huang, et al.; "Application of Nonlinear Kalman Filter Approach in Dynamic GPS-Based Attitude Determination," Proceedings of 40 <sup>th</sup> Midwest Symposium on Circuits and Systems, Vol. 2; Aug. 3-6, 1997, pp. 1440-1444.		
	C10	Gusinsky, V. et al; "New Procedure for Deriving Optimized Strapdown Attitude Algorithms," Journal of Guidance Control And Dynamics, Vol. 20, No. 4; July-Aug. 1997, pp. 673-680.		
	C11	Jiang, Y. et al.; "Error Analysis of Quaternion Transformations," IEEE Transactions on Aerospace and Electronic Systems; Vol. 27, No. 4; July 1991, pp. 634-639.		
	C12	Markley, F., et al. "Deterministic EKFLike Estimator for Spacecraft Attitude Estimation," Proceedings of 1994 American Control Conference, Vol. 1; pp. 247-251.		
	C13	McKern, R. et al.; "Strapdown Attitude Algorithms From a Geometric Viewpoint," Journal of Guidance Control and Dynamics, Vol. 4, No. 6; Nov.-Dec. 1981; pp. 657-661.		
	C14	Moskowitz, L.; "Part I: Measurement of Applied Acceleration-Accelerometer Calibration," Instruments & Control Systems; Feb. 1961, pp. 257-260.		

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## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

### Complete if Known

Application No.	10/684,950
Filing Date	October 13, 2003
First Named Inventor	Michael A. Horton
Art Unit	Not yet known
Examiner Name	Not yet known
Attorney Docket Number	18856-08206

Sheet 4 of 4

### OTHER REFERENCES – NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>6</sup>
	C15	Reynolds, R.; "Quaternion Parameterization and a Simple Algorithm for Global Attitude Estimation," Journal of Guidance Control and Dynamics, Vol. 21, No. 4; Jul.-Aug. 1998, pp. 669-671.	
	C16	Savage, P., "Strapdown Inertial Navigation Integration Algorithm Design Part 1: Attitude Algorithms," Journal of Guidance Control and Dynamics, Vol. 21, No. 1; Jan.-Feb. 1998; pp. 19-28.	
	C17	Schultz, R. et al.; "Airborne IRP Alignment Using Acceleration and Angular Rate Matching," 14 <sup>th</sup> Joint Automatic Control Conference of the American Control Council; June 1972, pp. 427-436 (1-7).	
	C18	Vathsal, S. et al.; "Spacecraft Attitude Determination Using a Second-Order Nonlinear Filter," Journal of Guidance Control and Dynamics, Vol. 10, No. 6; Nov.-Dec. 1987, pp. 559-566.	
	C19	Weiss, H.; "Quaternion Based Rate/Attitude Tracking System With Application to Gimbal Attitude Control," Proceedings IEEE Conference on Control and Applications; 1989, pp. 488-494.	
	C20	Wu, A. et al.; "Stellar Inertial Attitude Determination for LEO Spacecraft," Proceedings of 35 <sup>th</sup> IEEE Conference on Decision and Control; Vol. 3, No. 11-13; Dec. 1996, pp. 3236-3244.	

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